

jects on the time after death, or rather after the last respiration to show that contraction of the muscles could still be induced by electricity, when applied to them either in the form of the interrupted or of the continuous current. The excitability of the muscles appears to be the same as before death, for a short time after death has taken place; then contractility departing rather sooner in chronic disease than in cases where death has been occasioned by an accident or other sudden event. In most cases contractions may be excited for from $1\frac{1}{2}$ hour to 3 hours after death. The reaction to induced currents falls in a centrifugal direction; the sphincter palpebrarum retaining its irritability longest. From these experiments he was led to think that the absence of irritability in the muscles might be taken as a good means of distinguishing between real and apparent death, and accidentally very shortly afterwards a case of apparent death in an hysterical patient permitted him to satisfy himself as well as others of its value.

5. C. Heitzmann gives the results of his researches on healthy and inflamed bone, and agrees with Rokitsansky, that blood is formed in the mother shells that under certain conditions appear in bone.

Other physiological papers are, one by Prof. Bizzozero, of Pavia, on the so-called endogenous formation of cells. Another by Dr. Kolisko, on the mechanics of the heart, and another by Schiff on the round ligament. The papers dealing with therapeutics, are (1) an essay by Dr. Basch on the action of nicotin, especially bearing on the question of the relation of the blood pressure to the periods of rest and contraction of the muscular tissue of the intestines; (2) a number of minor communications from Schroll containing the results of investigations made in the Vienna Pharmacological Institution. The pathological papers of most importance are (1) the remarkable essay of Latorfer which has led to so much discussion in Germany, in which he declared that he was able to diagnose a certain specific disease (syphilis), by a microscopic examination of the blood; (2) an account by Dr. Philipp Knoll of a case of the rare disease termed paralysis pseudo-hypertrophica; (3) an essay by Dr. J. Popoff on pneumomycosis; (4) investigations on the organisation of thrombus by Dr. Durante; (5) on the changes taking place in ligatured vessels by Dr. Dudokaloff; (6) the diagnosis of disease of the optic thalami. Besides these are several others. The plates are very fairly executed, and our readers will see that Prof. Stricker has done good service in publishing these papers and essays in a collected form.

H. P.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

Reflected and Transmitted Light

[The following correspondence has been sent us by Prof. Tyndall]:—

Cliff House, Greenhithe, April 8

A CURIOUS thing in connection with colour having come under my notice, and never having before seen it remarked in any scientific journal, I take the liberty of bringing it before your notice; if it is new to you it will interest you, if not I must ask you to excuse me for troubling you. On looking through a piece of blue glass (of which I forward you a sample) at a plant or tree lit up by the sun, these leaves that are lit from behind, or rather by transmitted light, appear of a rich crimson, the other leaves, seen only by reflected light, merely take the colour given by the glass. In the case of a geranium plant, these leaves become almost the same colour as the flowers. As a scientific fact, if new, it is curious.

To Prof. Tyndall

WALTER B. WOODBURY

THE observation you describe is interesting, and if you have taken care to exclude subjective colouring, is, I should think, to be explained in this way.

The light from your leaves contains a quantity of red: it appears as a yellowish green, I suppose, and contains little or no blue.

Your glass is of a kind which transmits the two ends of the spectrum while cutting out its centre. It is very hostile to the yellow, hence, on placing it before the eye, and receiving through it light which has already been deprived of its blue, the glass quenches the yellow, and red alone remains.

April 9

JOHN TYNDALL

I detained this note until the arrival of sunshine, which enables me to say that the explanation here given is correct. Employing a blue medium, which does not transmit red you get no effect of the kind you describe. The tender leaves of spring are best suited for the experiment: the hard green leaves of ivy, for example, do not produce the effect.

It is not necessary, nor indeed desirable, to have the leaves between the eye and the sun.

April 15

The Zoological Collections in the India House

PERMIT me to offer my testimony in general support of the view taken by P. L. S., in the able article which appeared in your last number. Rather more than a year ago it was a matter of importance for me to examine the type of Horsfield's *Turdus varius*, contained in the Museum of the Old East India Company. I applied in the proper quarter for leave to examine the specimen, but received a polite answer informing me that it was inaccessible. The official statement therefore said to have been made in the House of Commons on March 14, 1871, by the Under-Secretary of State for India, as to the collections being still "available to men of science" is untrue, and I trust that some member of Parliament will not allow this subject to be lost sight of, but, by continually recurring to it, compel the Administration to open their valuable Museum to the public—their owners. To the two solutions of the difficulty suggested by P. L. S., allow me to add a third. If neither the authorities at South Kensington nor in Great Russell Street can properly exhibit the East India Museum, let it be transferred (of course under suitable guarantee), to some other National Institution.

Cambridge, April 22

ALFRED NEWTON

On the Affinities of Dinoceras and its Allies

IN the April number of the *American Journal of Science and Art* there is a paper by Prof. O. C. Marsh, entitled "Additional Observations on Dinocerata," in which we learn that Dinoceras has only four toes. The author still continues to consider the genera *Dinoceras* and *Tinoceras* a separate order intermediate between the Proboscidea and the Perissodactylata. The facts at my disposal are now sufficient for me to state with considerable certainty that *Dinoceras* and *Tinoceras* are members of the Ungulata Artiodactylata. The following are my reasons:—

1. The palate is complete between the posterior molars, as is seen clearly in a photograph of *Tinoceras grandis* (*Loxolophodon cornutus* Cope) in my possession.
2. There is no third trochanter to the femur (Marsh).
3. The astragalus has a well-marked cuboid facet (Marsh).
4. The posterior molar has a small but well developed third cusp, as proved conclusively by an inspection of my photograph.
5. The anterior premolar is wanting, six only being present.
6. The premaxillæ are edentulous.
7. There are four toes, an even number.

A. H. GARROD

11, Harley Street, April 22

Auroral Display

A SHORT but very brilliant display of aurora was visible here this evening, making its first appearance soon after sunset, and reaching its greatest intensity between nine and ten o'clock. Some notes of its phases which I was able to make in a perfectly clear sky will perhaps afford useful comparisons with descriptions furnished by observers of its appearance at other places.

The sun had set behind cirrus clouds, surrounded by a slight halo, and with a faint mock-sun on its northern side. As darkness approached, the hazy clouds in the north-west were surmounted by a faint light, and at half-past eight o'clock luminous streaks here and there across the otherwise clear sky, apparently

of cirrostratus cloud, had considerable resemblance to auroral beams faintly visible in the twilight; a considerable extension of the twilight-glow towards the north-west also suggested the very possible character of their light. Towards nine o'clock Mars rose really through a considerable haze in the east, and Venus, in full splendor, appeared setting among slight clouds in the west; the planet Jupiter, and all stars above a slight distance from the horizon, were altogether unobscured by clouds. A pretty bright white auroral arch, divided into low streamers, was at this time first distinctly formed, its lower edge being well marked by their bases, and the brightest streamers being clustered in two knots of the arch, in the middle of Cassiopeia, and of Lyra, the first immediately under Polaris, and the other close to the north-east horizon; the western prolongation of the arch was faint and diffuse, shining from behind and among the clouds around the planet Venus. Tall but faint streamers rose from it, none of which were conspicuous, excepting a pretty well defined one rising at 9^h 5^m from the strongly luminous light-cloud in Lyra, nearly to the tail-stars of Ursa Major. This beam grew sharper, and in the following minute it passed across σ Herculis, and ϵ Ursæ Majoris, but it shortly disappeared. Between 9^h 8^m and 9^h 12^m the two principal light-clouds in Cassiopeia and Lyra increased in strength, assuming with the contiguous part of the arch a perfect resemblance to the heavy fringe of a curtain gathered or folded upon itself at those points, and particularly in the group of streamers under α Lyra. At 9^h 12^m another luminous patch marked the western end of the arch between Venus and Capella, growing brighter, and from it a bunch of rose-coloured streamers sprang upwards between Auriga and Gemini as far as the forefoot of Ursa Major. At 9^h 15^m, the bright cloud-mass marking the eastern horizon-point of the arch under α Lyra also acquired great strength, throwing up a torch-like, fire-coloured streamer of moderate height and great brightness, terminating the arch abruptly in that direction. It rose from the horizon across α , χ to π , ρ , Herculis. A fainter arch underneath the former one was visible at this time, but less well-defined, and streamers rising from both arches, and mingling together, soon quite overspread the northern sky; a bunch of these streamers of rich crimson colour appeared at 9^h 18^m, extending for a short time across α , θ , and other neighbouring stars of Ursa Major, and fading gradually away, disappeared almost as quickly as it came. The number and sharpness as well as the height of the streamers rising from both the arches were now very great, and the light from all the surrounding streamers was so strong that I could read my watch and correct notes in my note-book at this time. A fourth bunch of red streamers rose from the arch at its extreme west end at 9^h 23^m from the neighbourhood of α Orionis to the stars γ , ν , in the feet of Gemini. This was the last strikingly red streamer seen during the display; its spectrum, like that of the white beams, which I examined with a small pocket spectroscope, appeared to consist only of the usual bright greenish line, which was very vivid in every phase of the aurora.

At 9^h 25^m, the whole northern half of the sky was covered with streamers, and arches, gradually forming a corona overhead, and increasing rapidly to great intensity and brightness. The boundary of the light from east to west was a definite line passing through, or very little south of the corona, whose centre was 3° or 4° east from the stars ν , χ in Ursa Major. Northwards from the boundary line the aurora consisted of six or seven parallel arches (of which only the lowest two had before been visible), more or less distinctly succeeding each other between the zenith and the horizon. Both the arches and streamers were stationary, and presented no sensible tendency to motion, however slow, while they were visible. At this time the brightening streamers began to flicker in their light. Waves of light, rising from the north, succeeded each other rapidly, and appeared to flow swiftly over them towards the zenith. Arch after arch was visible as the waves passed over them, and fitful gleams among the auroral masses overhead shot to and fro there, like flashes of summer lightning. The rays and wisps of the corona, and belts, or fragments of the aurora overhead were rendered especially luminous by these discharges. Farther from the zenith, in the north, the waves rose smoothly and steadily, with a motion that was indeed very swift, but it was yet quite distinctly discernible, and more easily distinguishable there, than in their passage overhead. The arches, or belts of the streamers appeared to be lighted up instantaneously, as they were reached. Although their inter-mixture in the north made

it very difficult to decide this clearly, yet the upward progress of the waves there was very evident, while no such ascending movements could be distinguished in the east and west quarters of the sky. The belts and arches stretching towards those parts of the horizon, through the zenith, and past, or through the corona, forming the termination of the aurora towards the south, were constantly lighted up by momentary flashes, extending almost simultaneously along their whole lengths. The brightness of the flashes in those parts of the aurora which included the corona, and arches or lateral branches extending from it towards the magnetic east and west points is easily accounted for by the belts and clusters of streamers in those positions being seen "on edge," or "end on," extremely foreshortened by perspective, so that the increase of light along their whole heights appeared to be concentrated, when the waves overtook them, to a single flash. The motion of the waves must be extremely swift, as they scarcely occupied more than a second in passing from an altitude of about 45° to the zenith. Supposing that (as the best observations of them have frequently agreed in showing) the heights of auroral arches, and of the bases of auroral streamers, are usually about 100 miles above the earth's surface, the velocity of propagation of these waves of electrical disturbance from north to south cannot have been much less than 100 miles per second. Such a prodigious velocity cannot possibly be ascribed to waves in the upper atmosphere driven by winds among its rarified strata, to which the sweeping motion of the light waves apparently wafted by gusts among the streamers otherwise bore a very singular resemblance.

At 9^h 34^m some of the strongest waves passing across the corona lighted up a faint white arch in the south, extending from Arcturus across the northern part of Virgo to the head of Leo, several degrees in width. At 9^h 37^m, when the wave disturbance, after continuing in full activity for about ten minutes, ceased as rapidly as it began, this arch and the corona still remained faintly visible; but together with all the other arches and streamers of any altitude lately lighted up by the waves, they soon vanished, and the whole appearance of the sky at 9^h 40^m was about the same as when the aurora was first seen. At 9^h 43^m, however, the northern sky was again crowded in every part with thin white streamers scattered indiscriminately over it, like groves of slender fir-trees on a hill-side, among which one very sharp and bright ray shone for a few seconds, springing from the horizon to a considerable altitude in the west, where it passed across ζ Tauri. At 9^h 50^m a streamer, starting from a base of intense whiteness near the same place, and tinged at the top with a pinkish hue, ascended across the stars μ , ν , as far as the star ι in Gemini, another very similar streamer almost simultaneous with it, also extended from between Gemini and Auriga to near the forefoot of Ursa Major; a few spots of very intense white light were at the same time visible here and there among the low clouds near the north-west horizon. At 9^h 55^m all conspicuous streamers had disappeared, leaving only a general glow, among the brighter parts of which the wave disturbance began again, and with less intensity than before, but with the same regularly ascending motions; the undulations succeeded each other without intermission until 10^h 5^m; they then ceased, and the faint appearances of the aurora which were visible after this time were, so far as I could observe them, until half-past eleven o'clock, of a very insignificant and inconspicuous character. The times in this description are from a comparison of my watch with the clock in the Carlisle railway station, and its hand and the figures on its dial being always distinctly visible by the light of the aurora, they have probably been recorded rightly to the nearest minute. Although the dates of the April meteoric shower usually occurring on the nights of the 19th, —21st of April are near at hand, I saw but one small shooting-star during the hour of the auroral exhibition. It had a short course in one of the brightest parts of an auroral cloud, and in its light and the aspect of its nucleus it did not appear to be affected in any way remarkably by its passage near or underneath the beams of the aurora.

A. S. HERSCHEL

Carlisle, April 18

April Meteors

DURING the evenings of April 19 (9^h to 11^h) and 20th (8^h 45^m to 11^h 15^m) 20 shooting stars were observed here. The sky was cloudless on both nights, and on the 18th and 19th bright displays of aurora were noticed. Of the 20 meteors 12 were well observed, and their tracks accurately marked; 8 of